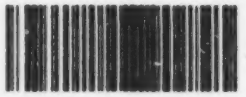

PB92-238500

Pesticide Fact Sheet Number 238
'Pseudomonas fluorescens' and 'Pseudomonas syringae' Strains

(U.S.) Environmental Protection Agency, Washington, DC

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

b. Identifiers/Open-Ended Terms

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Office of Pesticide Programs (TS-766C)
Washington, DC 20460

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EPA

Pesticide Fact Sheet

PB92-238500

Name of Chemical: Pseudomonas fluorescens and Pseudomonas syringae strains
Reason for Issuance: Registration of New Biological Pesticide
Date Issued: September 16, 1992
Fact Sheet Number: 238

DESCRIPTION OF CHEMICAL

Generic Name: Pseudomonas fluorescens A506
Pseudomonas fluorescens 1629RS
Pseudomonas syringae 742RS

Trade Name: Frostban

EPA Shaughnessy Codes: 006418 and 006411

Year of Initial Registration: 1992

Pesticide Type: Biological Control Agent

U.S. and Foreign Producers: Frost Technology Corporation

USE PATTERNS AND FORMULATIONS

APPLICATION SITES: Application will be made to cherry, apple, pear, almond and peach trees and tomato, potato and strawberry plants.

METHOD OF APPLICATION: Application may be made using standard ground spray equipment for applying dilute or concentrate sprays.

TYPE OF FORMULATION: Products are powder formulations containing 11.3×10^{10} colony forming units (CFU)/gram. This is equivalent to 71% of each isolate alone in three products or a total of 71% from a combination of the three isolates in another product.

APPLICATION RATES: The products are applied at the rate of 0.33 lbs/acre for concentrate sprays or 0.44 lbs/acre for dilute sprays.

SCIENCE FINDINGS

Summary Science Statement

The results of the data submitted confirm the lack of mammalian toxicity or pathogenicity of the live strains of the bacteria in the Frostban products by oral or inhalation routes of exposure, by intraperitoneal injection or by dermal application.

Requests for waivers of data requirements for avian oral, freshwater fish, freshwater aquatic invertebrate and nontarget insect testing were granted. Nontarget plant testing indicated that the strains of Pseudomonas in these products did not have any adverse effects on the plants tested. Testing of the organisms on honey bees was not submitted. Since the products will be applied during flowering, the honey bee testing will be required as a condition of registration. The organisms in these products will not pose a risk to wild mammalian species or to any endangered species.

Data for environmental fate are not triggered under current requirements for these products since the organisms are naturally occurring species and the results of initial Tier I tests did not indicate the need for additional testing.

CHEMICAL CHARACTERISTICS

Physical/Chemical Properties

Color:	Light tan
Physical State:	Powder
Odor:	fish
Bulk Density:	0.4g/cc
pH:	6.7
Corrosivity:	Non-corrosive
Storage Stability:	Unstable unless kept cool (4-10°C)

Toxicological Characteristics

Acute oral toxicity/pathogenicity test: Results of this test indicated that the combined organisms in these products were not toxic or pathogenic to rats 7 days after exposure to a dosage of 8.4×10^{10} CFU.

Acute intraperitoneal injection test: The test material was not lethal to or significantly toxic to mice when injected in a single intraperitoneal dose of 2.8×10^{8} CFU/animal.

Additional data/information: Testing of various Pseudomonas strains closely related to those contained in these products were conducted. Acute oral and acute inhalation toxicity tests indicated that the strains tested were not lethal or toxic to rats. Primary eye and primary dermal studies in rabbits using closely related organisms showed no significant irritation effects.

Ecological Characteristics

No adverse effects are expected from the use of these products on avian wildlife, aquatic organisms or nontarget insects because of the lack of demonstrated toxicity of the bacteria on these types of organisms. Additionally, due to the natural occurrence and

ubiquitous nature of the organisms and their lack of persistence on the crop plant, these products are not expected to cause a significant impact on these organisms.

In the nontarget plant study which was submitted, no adverse effects on the nontarget plants in the test were demonstrated.

No adverse effects to mammalian systems would be expected because of the lack of toxicity demonstrated in the toxicity testing of the Pseudomonas strains.

No risk to endangered species is expected due to the low toxicity, natural occurrence, ubiquitous nature, lack of phytotoxicity and lack of persistence of the bacteria.

Due to the application of the products during plant flowering, when honey bees are most active, a honey bee test is being required as a condition of registration.

BENEFITS

Some bacteria, which are found naturally on plant surfaces, initiate frost formation by providing a nucleus for ice formation. When such bacteria are present on plant surfaces, frost damage occurs at higher temperatures than when they are absent. The bacteria in these products, when applied to newly emerging plant tissue will displace the ice-nucleating bacteria which might normally occupy that site. Since these bacteria do not initiate ice-nucleation, the plant can withstand temperatures several degrees less before being affected by frost. This temperature difference would often be sufficient to prevent loss of the crop due to damaging effects of frost on flowers or tender foliage in the spring or may extend the growing season in the fall.

Ice-nucleating bacteria may also be controlled by chemical means. Registration of a biological frost prevention agent would provide a safer alternative to chemical pesticides.

The products are also intended to be used in an integrated fire blight control program on apples and pears. The products will be used in combination with reduced rates of standard antibiotic products currently used for fire blight control. This type of program would reduce exposure to antibiotics and possibly reduce or delay development of antibiotic resistance in humans and animals.

TOLERANCE ASSESSMENT

The petition which was submitted requested a generic exemption for the bacterial species Pseudomonas fluorescens and Pseudomonas syringae. It was concluded that there are insufficient data to support an exemption from tolerance requirements for all strains of these very common and widespread bacteria at this time. The data

are adequate to support an exemption from tolerance requirements for the specific bacterial strains in these products.

An exemption from the requirement of a tolerance is established for the residues of Pseudomonas fluorescens strain A506, Pseudomonas fluorescens strain 1629RS, and Pseudomonas syringae strain 742RS in or on all raw agricultural commodities when applied as a frost preventive or biological control agent on growing agricultural crops in accordance with good agricultural practices. Based upon the lack of toxicity and pathogenicity of these organisms in the Tier I mammalian toxicity/pathogenicity studies, an exemption from tolerance requirements is warranted. Additionally, data were submitted to demonstrate that there is a significant population of naturally occurring fluorescent pseudomonads present on washed fresh produce intended to be consumed raw.

SUMMARY OF MAJOR DATA GAPS

The only outstanding data gap for this biological control agent is the requirement for conducting a study to determine the effects of these organisms on honey bees. The study is being required since the products will be applied at flowering when bees are most active. There have been no reports of toxicity to insects caused by these bacteria so the risk posed to honey bees by conditional registration would be minimal. Additionally, the time limit being imposed for completion of this test (9 months) would insure that the study is completed prior to the spring use season for the products. Therefore, a conditional registration would be justified.

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DISCLAIMER: The information in this Pesticide Fact Sheet is a summary only and is not to be used to satisfy data requirements for pesticide registration and reregistration.